

# Mobile phone technology to improve functionality of rural water sources

BRIEFING  
NOTE

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## Introduction

This briefing note is the result of action research jointly carried out by IRC International Water and Sanitation Centre/Sustainable Services at Scale (IRC/Triple-S) and SNV Netherlands Development Organisation, to support the Mobile Phones for Improved Water access (M4W) initiative. Under the action research, IRC/Triple-S and SNV together with stakeholders at the national and district level analyse the process and issues in providing sustainable rural drinking water services. These learning's are translated into action for improving the initiative. The information and findings shared in this briefing note are based on a limited number of interviews and the two Management Information Systems (MIS) working group meetings and will not reflect all issues surrounding the M4W project.

## Background

Mobile Phones for improved Water access (M4W) is an initiative of IRC/Triple-S, SNV, Makerere University College of Computing and Information Science and WaterAid in partnership with the Ministry of Water and Environment (MWE) to improve functionality of rural drinking water sources by reducing the downtime and improve the Operations and Maintenance (O&M) support system. M4W is being piloted in 7 districts where water users can send a SMS to report a fault at a water source. This triggers action by the Hand Pump Mechanic and the follow-up can be monitored by the district water office, using the internet.

The information collected through M4W can directly be fed into the WATSUP (Water Atlas Update Project) database, which will continuously be updated by M4W, meaning that with the M4W innovation, the WATSUP (Water Atlas Update Project) database will have real-time information on the status of the water sources. This briefing note explains how the system works and reports progress from the pilot districts. The note also

discusses the challenges so far encountered by the M4W initiative and some of the actions that are planned for the coming months.

## Why M4W?

The Ministry of Water and Environment in collaboration with partners (Local Governments, NGOs and Development Partners) recently updated the information on coverage and functionality of the water sources. The Water Atlas Update Project (WATSUP) ended with the establishment of a Water Supply Database and publication of the 2010 Water Atlas, While the sector sees potential benefits from the improved information about the status of the rural water sources, for example by better planning for rehabilitation and investment of sources, it also realises that the real benefit for the water user is only achieved when the information of a broken water point leads to prompt repair of the source. The first challenge identified with the monitoring system is to improve not only the information, but the information *flow* that leads to action to improve the water services on the basis of information collected. In addition, it is acknowledged that the data of the recent Water Atlas 2010 was collected in 2009, which means that between collection and publication, a time span of 1 to 2 years exists. The second challenge for the sector is therefore, how it can keep the data and information on the more than 100,000 rural drinking water sources up to date.

Against this background and the increased use of mobile telecommunication, especially in the rural areas of Uganda, the Mobile for Water (M4W) Project was launched in October 2011. SNV, IRC/Triple-S, Makerere University and WaterAid in partnership with the Ministry of Water and Environment started the M4W initiative in the seven districts of Arua, Kabarole, Lira, Kyenjojo, Kasese, Amuria and Masindi. The pilot project aims at:



## M4W Briefing Note, April 2012

- i. Improving efficiency in reporting faults;
- ii. Triggering action for response to non-functional sources; and
- iii. Improving efficiency in updating District and National Information Systems.

During the meeting to update the sector on M4W on 11 April 2012, the WaterAid Uganda Country Representative of emphasised the potential of M4W to improve equity in the decision-making, because it will increase transparency in resource allocation for repairing and rehabilitating old sources and construction of new ones. She also foresees that the initiative will help sector agencies by providing evidence for their lobby and advocacy for investment in the most deserving areas/communities.

During the same meeting, the Ministry voiced their high expectation of the initiative as they expect an important cost reduction on their sector monitoring task. Another possible benefit the participants of the meeting identified is that M4W will improve accountability between users, local government and the artisans responsible for repairs as their actions can be tracked and results publicly made available. This increased accountability should improve the engagement of the consumers with their drinking water services, resulting in a higher willingness to pay. M4W is seen by the initiators as an innovation to the WASTUP and at the moment is in a pilot phase during which both the technology and the roles of the different stakeholders will be tested, improved and further defined. The aim is to roll it out at country scale as soon as it will be ready.

### How M4W works

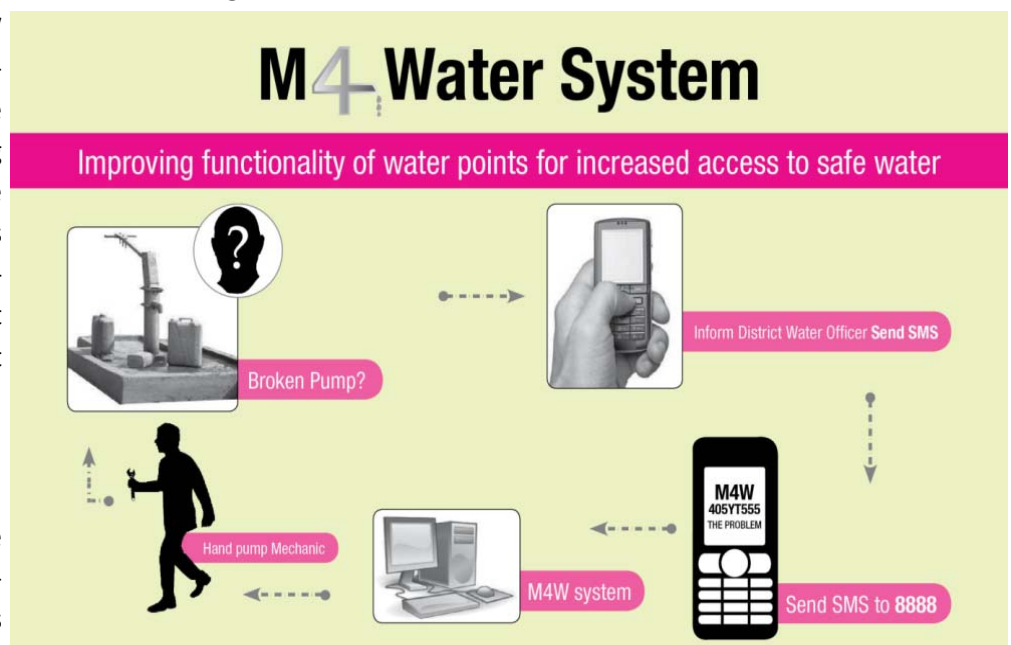
The M4W System utilises mobile technologies and web-based information systems to collect, process

and provide real time information on performance of rural water services to all the stakeholders. The system has a short message (SMS) based information exchange system that transmits messages on breakdown or interruption in water services to hand pump mechanics and to a central database managed by the District Water Officer (DWO), which will be linked to the Ministry Water Supply Database.

The project provides Java-enabled telephone handsets to the Hand Pump Mechanics (HPMs) and Community Development Officers/Health Assistants (CDO/HAs) to allow entering, uploading and approval of more elaborate information for the baseline and assessment reports. The information is collected in offline mode of the phones, which enables data collection to continue when the network is down. Problems with the water source can be reported by water users by sending a SMS with any type of mobile phone. Charges for transmission of information are typically less than Uganda shillings 2/=. The system also enables the DWO to generate reports and users to access information on the rural water sources online.

### Reporting a Problem

When the water source has a problem, a caretaker or any member of the community can report the problem

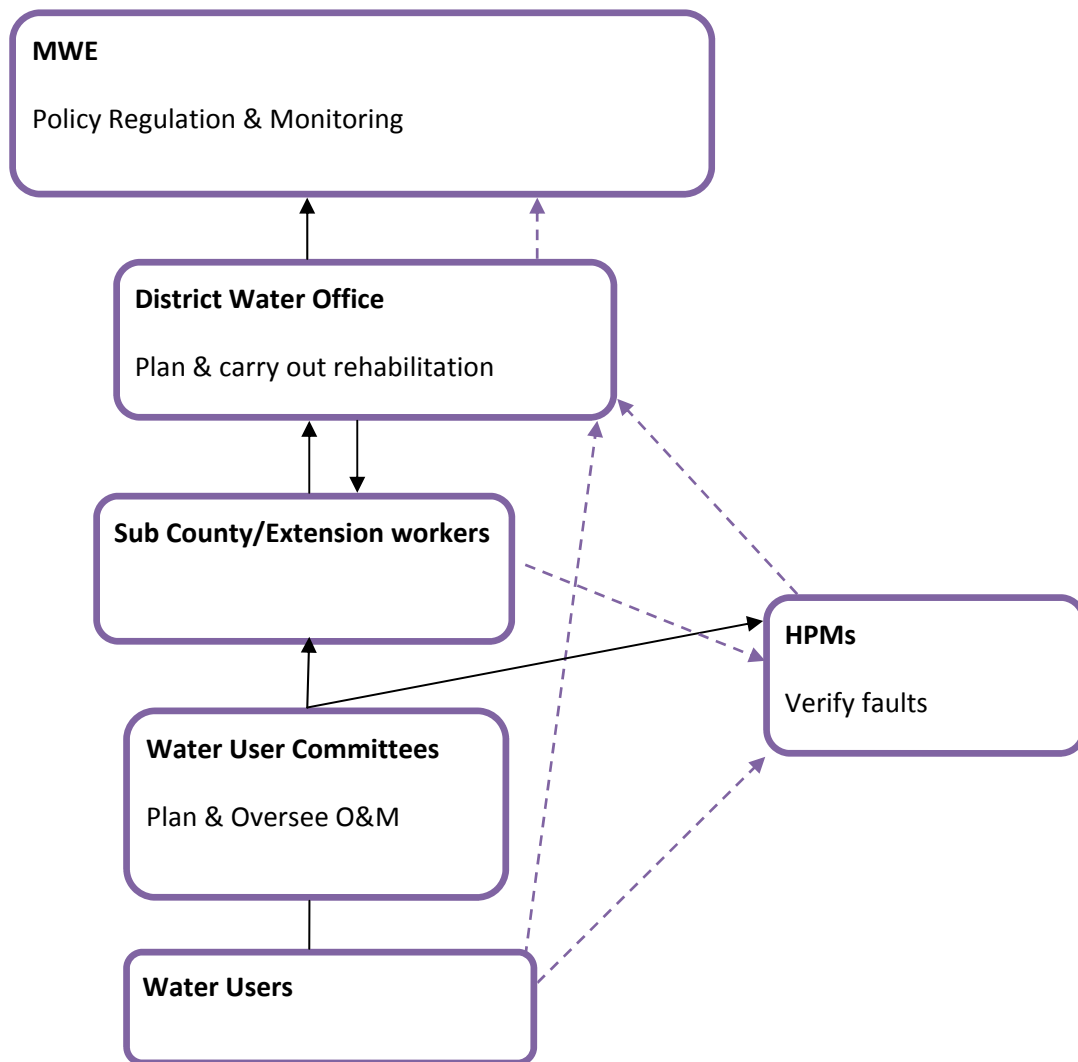


by sending a SMS. The format for the SMS is: **m4w<space>water point ID<space>problem**. The **Water Point ID** is the unique number assigned to a particular water source. This number appears on the sticker placed on the water source. The SMS should be sent to **8888**. When the SMS is received by the system, a ticket is created. The ticket means that all communication and action related to the ticket can be followed by for example the DWO, via the website.

**Response to Water Point Problems**

When an SMS is sent, the Hand Pump Mechanic (HPM) for the sub-county receives a notification about the problem. The HPM will go to the water source to carry out an assessment of the problem that has been reported. Depending on the nature of fault, the Water and Sanitation Committee (WSC) responsible for the water point will agree with the HPM on the needed repair if it is a minor breakdown. And if it requires a major repair, this will be handled by the district water office. In case the HPM carries out the repair directly, he/she will report this to the system and the ticket will be closed. In case the HPM reports that a major repair is needed, a repair form will be created and the follow-up action of the district water office is required.

After receiving the SMS, the HPM is supposed to carry out the assessment within 48 hours. The system automatically sends an SMS message to the CDO/HA when no assessment is received. This prompts the CDO to



contact the HPM to inquire why no action has been taken yet.

**Update of the WATSUP**

The information collected by the system can directly be used by the DWO to update his district database and the WATSUP, as the same water point IDs are used.

**Baseline and Inspection Data Collection and Review**

When M4W is introduced in the district and the water sources are entered in the system, baseline data is collected. The data is based on the same format for data collection as the WATSUP data collection. Baseline data collection starts with a request by the DWO through the system, which is received by the data collector



## M4W Briefing Note, April 2012

(HPM) who will collect the data in his/her area (often a sub-county). When the baseline data collection is completed, the CDO or HA at sub-county level is notified by a SMS. The CDO/HA will verify the data on a sample basis and approve the data entry.

A leader of the WSC or the caretaker of a water source works with the HPM to conduct collection of baseline data and provides information about the water source in the following areas:

- Functioning and composition of the WSC (meetings held, user fees collected)
- Location of the water point.
- History of water point (repairs and service)
- Current status of water point (functionality and type and reason for problem if any)

### Stakeholder roles in Monitoring and supporting rural water service delivery

The Operation and Maintenance Framework (MWE 2004) stipulates roles of the different stakeholders involved in the rural water service delivery under the Community Based Maintenance System (CBMS). The roles are represented in the figure below. The straight arrows show the current reporting and information flow mechanism under the CBMS while the dotted ar-

rows show the reporting system that is used under the M4W initiative.

From the diagram above, it is clear that water users have a more direct possibility to report a problem with their water source and that the M4W system provides better accountability lines between the stakeholders responsible for O&M of the drinking water service.

In addition, the DWO can generate at any moment, a full status report, which has real time status information on all the water sources in the district.

### Progress with the M4W pilot

M4W started in September 2011 with the identification and consultation of the various actors and their roles in the areas of monitoring, (O&M), both at the decentralised and central level to ensure that the initiative is fully aligned with the existing procedures and systems. At the decentralised level, consultative meetings were held with district water officers, Hand Pump Mechanics (HPMs), Health Assistants (HAs), Community Development Officers (CDOs), TSUs (Technical Support Units) and local political leaders.

Based on the analysis of the existing monitoring and O&M system and the requirements, the M4W system was designed and the hardware procured. Stickers with the unique water point IDs were produced. Between

District	No. sources in WAT-SUP	No. sources data entered in M4W system	No. of sources data approved by district
Kabarole	1,528	769	769
Lira	1,152	946	946
Kyenjojo	981	56	56
Kasese	1,923	60	60
Amuria	682	255	255
Masindi	701	102	102
Arua	1,877	715	715
<b>Total</b>	<b>8,844</b>	<b>2,903</b>	<b>2,903</b>

October 2011 and February 2012 all involved stakeholders in the 7 districts were introduced to the system and received training on how to use M4W.

The actual roll-out of the system started in January 2012 with the collection of the baseline information on all rural water sources in the 7 districts. While the collection of data and mapping of the water sources is ongoing, the water users are not yet encouraged to use the system for reporting problems with the sources. This provides both the stakeholders that use the system and the partnership that manages M4W to familiarise themselves with the technology and interfaces and to address teething problems. The table below provides the status of data collection for the baseline as it stands at the end of March.

### Overcoming challenges

M4W is aiming to bring innovation to the existing monitoring and O&M system for rural drinking water services. At the moment it is still in its pilot phase where the technology is being tested, the roles of the involved stakeholders are being shaped and their capacities to use the system are being built. The initiative therefore has some problems some of which include:

- i. Stickers on the water points that don't last
- ii. The server that is down or phones that cannot connect;
- iii. Phones lose configuration because HPMs change the SIMcard; and
- iv. Communication problems between the project implementers and the stakeholders that are the users of the system

In addition, M4W is also encountering some challenges that are mainly related to the institutional framework in which M4W operates. These include:

**Capacity building of stakeholders:** Reports from the pilot districts indicate that the stakeholders are still

struggling to use the system. Not only the HPMs, but also the CDOs and DWOs have indicated that they need additional training before they are confident to use the system. In Kasese and Kyenjojo districts, training was provided 4 to 5 months back and without having used the system much, most HPMs will need a refresher course. Delays in the implementation have in some districts occurred, because the DWO were not sufficiently capable to operate the system and allocate work to the HPMs.

**Literacy of the HPMs:** A number of HPMs have difficulties using the English language and writing the required reports. In principle, one can also enter information in any local language, but the questions and format remain in English. The HPMs are encouraged to find their own solution, for example by asking a family member (often a child) to help them use the phones. In the longer run it may need to be considered to include basic English in the capacity building package of the HPMs.

**Compensation of transport cost:** Uganda shillings 1,000/= is offered by the M4W Project as compensation to HPMs and CDOs for each source reported. This is insufficient especially for the more remote sources and the project is looking into increasing the compensation. In addition, the CDOs or HAs do not need to verify all reports on the sources, but a 10% sample of the ones covered by a HPM should be sufficient. The CDOs and HAs will be encouraged to combine their visits with other activities in the area. And some verification can also be done by phone in case a physical visit to the location of the source is not possible.

**Transport of HPMs:** The HPMs struggle to reach water sources that are located in remote areas. Only a few HPMs have access to motorbikes. This problem is not specific for M4W, but is a general challenge for the O&M system of the rural drinking water services. Solutions are discussed in the context of the newly created Hand Pump Mechanic Associations (HPMAs), where a number of motorbikes may be shared among the HPMs.

## M4W Briefing Note, April 2012

**Inconsistencies between WATSUP and M4W data:** In the sub-counties where data has been collected, M4W found that 19% of the sources identified by M4W were not entered in the WATSUP. This figure is after 2009 when the newly constructed ones were filtered out. Some of differences can be fed back to changes in boundaries of sub-counties, or mistakes made during the entering and/or processing of the data. But more importantly it is already showing the value of M4W in improving the WATSUP information. At the same time it also points to the need for proper verification procedures. The verification should be carried out under the responsibility of the DWO who can delegate to the sub-county level. The data that has been uploaded by the HPM should not be approved before it is validated by the CDO or HAs supervising the HPM. Clear guidelines for verification also need to be provided to the district water office, like sample size, and methods such as physical visit and verification by phone.

### Way forward

The MWE is encouraging the initiators of M4W to do a proper financial analysis of the introduction and running costs of applying M4W country wide. The initiators have also been requested to look into what strategy would be best for scaling-up the initiative, e.g. a gradual rolling out thoroughly resting the system

Other suggested issues for follow-up in the next 3-4 months include:

**Linking M4W and formation of Hand Pump Mechanics Associations (HPMAs):** The M4W initiative and the undertaking to form HPMAs in all districts in Uganda can be of mutual benefit to each other. In principle, M4W has proven to be a strong motivator for the HPMs and it is expected that it will increase the market of small and larger repairs for the HPMs. The HPMA when successful will make the individual HPMs members of a team who will support each other, in doing the repairs and sharing transport and tools but also in, for example, using the M4W system.

**Communication strategy for starting up M4W:** Once the baseline data of most of the sources in a sub-county are collected and the involved stakeholders are able to use the M4W system comfortably, the system should be put in use for the fault reporting. This will require that all water users are made aware about the system and how they can report and get feed-back on the action undertaken to maintain their water sources. For this a communication strategy, involving local leaders and media will be developed and implemented.

**Include M4W in the operational budget of the district water office.** One of the recommendations that are made by some of the DWOs of the pilot districts is that their budgets should have an allocation to facilitate activities needed to use the system. This would include a budget to organise follow-up team meetings and training of the stakeholders.

**Update of WATSUP with M4W information:** During the collection of baseline data, quite a number of mismatches between the WATSUP and M4W data have been noted. It will be important to develop a proper procedure of how the DWO can verify the information and update the WATSUP information with the new information collected.

### MIS Working group

The Monitoring Information System (MIS) Sub-Working Group is part of the Performance Working Group led by the Water Sector Liaison Office of MWE. The working group coordinates the different initiatives that are on-going to improve monitoring in the Uganda WASH sector. It therefore brings together stakeholders of government, civil society and organisations with a special interest in the subject, like the Makerere University and the Uganda Bureau of Statistics. To date the working group has organised two meetings, which were used to update the sector on progress and issues related to M4W and to recommend on the way forward of the initiative.